

electro-chemical decomposition and *transfer* which Sir Humphry Davy described in his celebrated paper,¹ were those in which acids were passed through alkalies, and alkalies or earths through acids;² and the way in which substances having the most powerful attractions for each other were thus prevented from combining,, or, as it is said,, had their natural affinity destroyed or suspended throughout the whole of the circuit,, excited the utmost astonishment. But if I be right in the view I have taken of the effects, it will appear that that which made the *wonder* is in fact the *essential condition* of transfer and decomposition, and that the more alkali there is in the course of an acid, the more will the transfer of that acid be facilitated from pole to pole; and perhaps a better illustration of the difference between the theory I have ventured, and those previously existing, cannot be offered than the views they respectively give of such facts as these.

287. The instances in which sulphuric acid could not be passed through baryta, or baryta through sulphuric acid,³ because of the precipitation of sulphate of baryta, enter within the pale of the law already described (116, 148), by which liquidity is so generally required for conduction and decomposition. In assuming the solid state of sulphate of baryta, these bodies became virtually non-conductors to electricity of so low a tension as that of the voltaic battery, and the power of the latter over them was almost infinitely diminished.

288. The theory I have advanced accords in a most satisfactory manner with the fact of an element or substance finding its place of rest, or rather of evolution, sometimes at one pole and sometimes at the other. Sulphur illustrates this effect very well.⁴ When sulphuric acid is decomposed by the pile, sulphur is evolved at the negative pole; but when sulphuret of silver is decomposed in a similar way (172), then the sulphur appears at the positive pole; and if a hot platina pole be used so as to vaporise the sulphur evolved in the latter case, then the relation of that pole to the sulphur is exactly the same as the relation of the same pole to oxygen upon its immersion in water. In both cases the element evolved is liberated at the pole, but not retained by it; but by virtue

of its elastic,

.¹ *Philosophical Transactions*, 1807, p. i. ² *Ibid.* p. 24, etc.

³ *Ibid.* p. 25, etc.

⁴ At 416 and 492 of Part V. will be found corrections of the statement here made respecting sulphur and sulphuric acid. At present there is no well-ascertained fact which proves that the same body can go directly to
•*either* of the two poles at pleasure.—December 1838.